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Research Paper

Determinant Risk Factors on Valuation of Banks' Stock Return: A Case of Financial Institutions Management

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Abstract

This study investigated the relationships between CAR and UE given a number of risk determinant factors with study sample of 248 banking firms between 2000 and 2010 using a single index model by testing cross section and period fixed effect on panel data. We first tested the relationship between CAR and UE. The R square of the test indicated that 49.03% of variance in CAR can be predicted by UE and the model is fit at significant level of (P value=0.000). According to the coefficient determination, UE is a significant predictor of CAR. Moreover, the R square of regression model 3 is 51.28% showing fitness of the model as well but according to coefficient determination only UE is significant at significant level of (p value<0.00). This implies that although the model is fit the significance of the model is due to UE and not due to PR. The empirical results show that UE has positive significant effect on CAR. The findings also suggest that the risk determinant factors do exert less significant influences on UE to predict CAR. Therefore, UE is the best predictor of CAR in banking firms.

Key Words: *Cumulative Abnormal Return, Unexpected Earnings, financial Risk Determinant Factors, and Financial Institutions Management*

1. Introduction and Background of the Study

Assets transformation involves purchasing primary assets and issuing secondary assets as a source of funds and it is a continual activity of financial institutions of all the economies of the world (Gary and Andrew 2002). Financial institutions transform assets from savers and depositors to borrowers a process known as financial intermediations (Gorton and Winton 2003). They create a special kind of debt immune to adverse selection by privately informed traders (Gorton and Pennacchi 1990). According to (Amir 1993) firm's earnings will reflect managements' performance, estimate the ability of representative earnings, and assess investment risk. Based on the efficient market hypothesis (e.g., (Fama and MacBeth 1973), stock prices will react instantaneously if there are new information relating to earnings. Due to this earnings information, managers focus on all the information available in the market to make predictions, and make investment decisions in the best interest of their firms' financial performance (Kaplan 2008).

Recent study found correlations between changes in accounting earnings and stock prices, where stock prices would move according to the belief of the investor with respect to the ability of company to generate profits (Grant 1980). The difference between investors' expected earnings and firm's actual earnings is called cumulative abnormal returns and is often used to investigate the events that affect stock price with respect to the different market reactions to earnings announcement (Purnamasari, et al. 2012). When the actual returns are higher than the expected returns (reflecting good news), Investors will buy stocks which will drive the stock prices above the fundamental value which in turn will result on positive abnormal returns. On the other hand, when the actual returns are lower than the expected returns, there would be negative abnormal returns, (Ball and Brown 1968).

Therefore, the relationships between earnings and returns have an important role in determining sustainable growth of financial institutions. Financial institutions borrow from consumer/savers and lend to companies that need resources for investment and engage in financial intermediation as well as in underwriting which means risk pooling and risk taking. As results, considerations of risk determinant factors that affect financial institutions have been vital in financial literature and have been important topic for investigation given that the overwhelming proportion of every dollar financed externally coming from banks (Gary and Andrew 2002).

There is an extensive literature on the studies of cumulative abnormal returns (hereafter referred to as CAR) of banking firms with different approaches that have made significant contributions to the understanding of stock price reactions to unexpected changes in accounting earnings following the pioneering work of ball and brown (1968) that have received much attention and led the intellectual discourse. These include the anomaly variables such as earnings surprises and asset growth (Fama and French 1996). The unsystematic security returns and the magnitude of earnings forecast errors (Beaver, et al. 1979) and the determinant factors of ex post credit risk vis ex ante credit risk (Louzis, et al. 2012). The earnings lack of timeliness and value-irrelevant noise in earnings return (Collins, et al. 1994), and the determinants of earnings response coefficients (Cho and Jung 1991). The unexpected earnings and abnormal security returns in the presence of financial leverage (Dhaliwal, et al. 1991) and the effect of the default risk of debt on the earnings response coefficient (Dhaliwal and Reynolds 1994) and (Billings 1999). The trade credit and the effect of macro-financial shock (Choi and Kim 2005) as well as the re-examination in the presence of illiquid growth opportunities risky debt and the earnings response coefficient (Shangguan 2007).

In this article we investigate the relationships between CAR and UE in combinations with a number of bank related financial risk determinant factors which include SR, CR, MR, PR, IR, and LR with study sample of 248 banking firms between 2000 and 2010 using a single index model by testing cross section and period fixed effect on panel data. The rest of the paper is organized as follows: section 2.1 below focusses on the literature review, followed by the methodological processes in section 3.1. Section 4.1 presents the empirical results followed by analyses and discussions of the result in section 5.1. Section 6.1 provide the conclusions with limitations of research of the study and provide recommendations.

2. Literature Review

(Louzis, et al. 2012) examined the determinants of non-performing loans (NPLs) in the Greek banking sector, by testing on consumer loans, business loans and mortgages) as macroeconomic and bank-specific variables and found that business and consumer NPLs is negatively and statistically significant related to interest rates and credit risk. (Dhaliwal, et al.1991) investigated the unexpected earnings and abnormal security returns in the presence of financial leverage, and found the firm's default risk measured by financial leverage that affect the earnings response coefficient. (Giliberto 1985) examined the interest rate sensitivity of a financial intermediary's common stock and re-specify in an attempt to estimate each factor's influence and found that the re-specification results in biased estimators because hypothesis

tests are flawed by failure to acknowledge the bias; this casts doubt upon the reported findings. (Chan and Faff 2003) investigated liquidity prices in an Australian setting, using monthly data from 1990 to 1999 and found negative evidence between liquidity prices and stock returns. (Faff and Howard 1999) analysed the relationship between changes in interest rates and returns on the shares of Australia banking and finance companies and found evidence of (1) sensitivity to long-term interest rates; (2) instability of interest rate sensitivity across sub periods; and (3) interest rate sensitivity of large banking and finance companies. (Byström, et al. 2005) examined the relationship between default risk and firm size, book-to-market ratio and stock returns during a severe crisis and found a significant increase in market based default probabilities around the crisis and a fairly slow return to pre-crisis levels but, did not find significant evidence of the book-to-market ratio being related to the default risk. (Fah and Nasir 2011) examined four financial risk factors to study the CAR of bank shares and found evidences: (1) there is a strong returns-to-earnings relation for banks; (2) The liquidity risk has information content beyond earnings changes in the returns-to-earnings relation. (Ariff and Cheng 2011) and (Cheng and Ariff 2007), had reduced 21 accounting and financial ratios into four (4) factors to examine the integration of the factor-analysed determinants on CAR for Malaysia commercial banks. Based on their findings credit risk has information content beyond earnings. (Cheng and Nasir 2010) investigate seven risk factors that affect earnings response coefficients in China commercial banks. The study finds that the liquidity risk contains the information beyond earnings change, which contributed significantly to the returns to earnings relation. (Dimitropoulos, et al. 2010) examined quality of information of annual accounting earnings within Greek banking institutions by focusing on the most significant risks facing by such firms and specifically interest rate risk, credit risk, liquidity risk and solvency risk, alongside with the persistence of earnings and bank size as significant determinants of ERCs.

Their study revealed interest rate risk has a positive but not significant effect on the return-earnings relation but on the contrary solvency risk, credit risk and liquidity risk proved to have a negative impact on the valuation process for both small and big-sized banks. (Zakaria, et al. 2013) examined whether default risk has any effect on the earnings response coefficient (ERC) while controlling for the established determinants of ERC. The study found default risk negatively related to be to ERC by confirming that beta is only a partial measure of risk relevant to ERC. (Ghosh, et al. 2005) explored the effects of sustained increases in earnings and revenues and showed that firms reporting sustained increases in both earnings and revenues have (1) higher quality earnings and (2) larger earnings response coefficients (ERCs) than other firms reporting sustained increases in earnings alone. (Myers, et al. 2007) provided evidence on firms that report long "strings" of consecutive increases in earnings per share (EPS) to enjoy abnormal returns that average over 20 per cent per year during the first five years of these strings, and these returns are larger than those firms reporting at least five years of consecutive increases in annual (but not quarterly) EPS.

3. Methodological Process

The methodological approaches of managing risk and return under the assumptions of portfolio theory had been initiated in 1950s. The theory assumed that for a given level of rate of return, one can derive the minimum investment risk by minimizing the variance of a portfolio; or for a given level of tolerable risk, one can derive the maximum returns by maximizing the expected returns of a portfolio (Ruppert 2004). These assumptions is known as the mean-variance methodology for the portfolio selection decisions which has been the central concept of risk and returns of any portfolio and the assumption of the portfolio and has served as a basis for the developing modern financial theory in the past four decades (Elton, et al. 2009). According to (Elton, et al 2009), the breakthroughs in implementations of portfolio theory fall into two categories: the first concerns a simplification the amount and types of the input data needed to perform portfolio analysis. The second involves a simplification of the computational procedures needed to calculate optimal portfolios. "these issues are interdependent and their resolution vastly simplifies portfolio analysis which results in the ability to describe the problem and its solution in relatively simple terms, terms that intuitive as well as analytical meaning, and terms to which bank managers can relate" (Elton, et al. 2009)(p.130).

3.1 The Input Data to Portfolio Analysis

Simplifying the number and types of the input data has been one of the main research topics in this field for the last four decades resulting in number of models. Perhaps the best well-known model of this type is the single Index model. To define the efficient frontier we must be able to determine the expected return and the standard deviation of return on a portfolio (Elton, Gruber, Brown, and Goetzmann 2009).

The expected return on any portfolio can be written as:

$$R_p = \sum_{i=1}^{n} R_i \; X_j \qquad 2.1$$

While the standard deviations of return on any portfolio can be written as

$$\sigma^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} \sigma_{ij} \; X_i X_j, \qquad 3.2$$

The equations define the input data necessary to perform portfolio analysis. As can be seen from equation (2.1), we need estimates of the expected returns on each security that is a candidate in the portfolio. From equation (2.2), we need estimates of variance on each security, plus estimates of the correlation between each possible pair of securities for the stock under consideration (Elton, et al. 2009).

The need for estimates of correlation coefficients differs both in magnitudes and in substances from the two previous requirements (Elton, et al. 2009). To estimate the future performance of stocks, at a minimum this means producing estimates of expected return on each stock. However, with uncertainty of returns, providing estimations of risk is necessary. In order to estimate the risk of a single stock or standard deviation of a single stock, the following formula is assumed: Hence, it is needed that

$$\sigma_i{}^2 = \sum_{i=1}^{n} \; P_i (K_i - K)^2 \qquad 3.3$$

To understand portfolio risk, some simple portfolios of A and B can be formed and examined how the correlation coefficient affects the level of portfolio risk. Then at a direct way of calculating the risk of a portfolio context, the following formula can be applied.

$$\sigma_\rho^2 = \sum_{i=1}^{n} w_i^2 \, \sigma_i^2 + \sum_{j=1}^{n} \sum_{k \neq j} w_j \; w_k \rho_{j,k} \sigma_j \sigma_k \qquad 3.4$$

Then it can be looked at the risk of the portfolio when diversifying as much as possible, and see that if assets are uncorrelated. When investing with lots of assets available, then the risk of the market portfolio approaches zero. In this case: If the market portfolio (the most diversified portfolio that investors can form) has risk, it is because the assets are correlated. That leads investors to the notion that the level of risk for any asset is related to the level of correlation with other assets

3.2 Overview of Single Index Model

The input data of the maximization problem are expected returns of securities and variance-covariance matrix of the expected returns of securities in a portfolio.

$$R_i = \alpha_i + \beta_i R_m \qquad 2.5$$

Where

α_i is the component of security i's return that is independent of the market's performance and is a random variable.

R_m is the rate of return on the market index and is a random variable.

β_i is a constant that measure the expected change in R_i given a change in R_m of standardized unexpected annual earnings.

This equation simply breaks return into two components, that part due to the market and that part independent of the market. β_i in expression measures how sensitive a stock's return is to the return on the market (Elton, et al. 2009) (p.132).

The term αi represents that component of return insensitive to (independent of) the return on the market. It is useful to break the term αi into two components. Let α_i denote the expected value of α_i, and let ε_i represents the random disturbance (uncertain) element of α_i.

Then,

$$\alpha_i = \alpha_i + \varepsilon_i$$

Where ε_i has an expected value of zero and the equation for the unexpected annual earnings (UEs) or return on a stock can be expressed by the following equation:

$$R_i = \alpha_i + \beta_i R_m + \varepsilon_i \qquad 3.6$$

According to (Elton, et al. 2009), both ε_i and R_m are random variables. They each have a probability distribution and a mean and standard deviation. Thus denoting their standard deviation by β_i, R_m:

$$cov\ (\varepsilon_i\ R_m) = E\left[(\varepsilon_i - 0)(R_m - \overline{R}_m)\right] = 0 \qquad 3.7$$

If ε_i is uncorrelated with R_m, it implies that how well equation (3.3) describes the return on any security is independent of what the return on market happens to be (Elton, et al. 2009). Estimations of α_I, and β_i, are often obtained from fixed effect regression analysis. Fixed effect analysis is one technique that assumes that R_m is uncorrelated with the idiosyncratic error ε_i at least to the period to which the equation has been fitted.

3.3 Empirical Models

The relationships between abnormal returns as dependent variable and standardised unexpected earnings is,

Model 1, $CAR_i = \alpha_1 + \alpha_2 UE_i + \varepsilon_i$ 3.8

The relationships between abnormal returns as dependent variable and standardised unexpected earnings interest rate risk, liquidity risk, credit risk and solvency risk as independent variables are tested in the regression:

Model 2, $CAR_i = \alpha_1 + \alpha_2 UE_i + \alpha_3 IR_i + \alpha_4 LR_i + \alpha_5 CR_i + \alpha_6 SR_i + \varepsilon_i$ 3.9

Where

CAR_i: is a cumulative abnormal return over a 12 months window,

UE_i is an unexpected Annual Earnings,

IR_i: is an interest risk factor,

LR_i: is a liquidity risk factor, and

CR_i: is a credit risk factor,

SR_i: is a solvency risk factor,

ε_i: is an error term

The regression framework then models the CAR as separate linear equations. Accordingly, two regressions will be performed having been specified as follows:

Model 3, $CAR_1 = \alpha_1 + \alpha_2 UE_i + \alpha_7 PR_i + \varepsilon_i$ 3.10

Model 4, $CAR_i = \alpha_1 + \alpha_2 UE_i + \alpha_8 MR_i + \varepsilon_i$ 3.11

Using Haussmann's specification test for fixed effects model, we check if the unit-specific heterogeneity term is correlated with (some) regressors when using fixed affect models following (Greene 2003) (p. 301).

3.4. Hypotheses Testing

The study posits the question whether changes in stock prices are explained/ determined as shown by the sign and the magnitude of the unexpected annual earnings changes in banking firms or not. The hypothesis is formulated in the following way:

H0: $\rho = 0$
H1: $\rho < 0$

H1: changes in returns-to-earnings relationships are not explained/ determined as shown by the sign and magnitude of changes in the unexpected annual earnings in banks.

The null will be accepted if there is no significant relationship between changes in returns-to-earnings relationships and changes in unexpected annual earnings, i.e. the t-statistic for α_2 is insignificant.

H2: None of the risk determinant factors that are interest rate risk, solvency risk (capital adequacy ratio), liquidity risk, and credit risk, and price risk and market risk factors affect the changes in returns-to-earnings relationships in the unexpected annual earnings in banks.

The null will be accepted if the t-statistics for $\alpha_3, \alpha_4, \alpha_5,$ and α_6 are not significant. The model fit will be tested using the F-ratios while the size of the R-squared values.

UEs are statistically significantly related to CAR that the relationship is positive (as UEs increase, CAR increase) or negative (as UEs decrease, CAR increases).The magnitude of the relationship is small, medium, or large. If the magnitude is small, then a unit change in UEs is associated with a small change in CAR.

The research hypotheses (i.e. H1 and H2) are investigated by testing their antithesis, the null hypothesis (i.e. H0 and H1). If the null hypotheses are rejected then the study's results substantiate the research hypotheses. This suggests that the existence of the investigated relationship in the population is not due to chance or sample variation. Conversely, if the study fails to reject the null hypothesis, then one cannot conclude that the investigated relationship does not exist in the population. Instead, one can conclude that the study failed to demonstrate that the existence of the investigated relationship is not due to chance (Keppel 1973). A further explanation is that the study lacks adequate statistical power to detect the investigated relationship in the population.

The model is applied to a dataset of banking firms from 2000 to 2010 inclusive. A set of ratios is calculated as discussed above. The study undertakes three tests to determine whether the predictive ability of the Model is statistically significant better or not as follows:

i. The parametric Watson test for two-paired samples at the one-tailed 5% significance criterion,
ii. The normalised approximation to the Watson test and
iii. Calculations of confidence intervals

In additions to that, statistical power analyses are conducted and examinations of models' performance vis a vis chance are made. Finally, the model fit will be tested using the F-ratios while the sizes of the R-squared values are used to test the model fit.

4. Presentation of the Empirical Analysis

The descriptive statistics of all variables used in this study produced by the descriptive option shows the number of observation (n=248). It is a summary of the results of the classical linear regression analysis (see: Appendix 1). It can be concluded that the data is normally distributed since the probability associated with the test of normality is more than the significance level of the usual p-value (p-value = 0.05). Correlations of criterion variable and the predictor variables as well as covariance of all financial risk determinant factors and CAR are shown in table 2 and table 3 respectively (see: appendix 2 and appendix 3). The test results for the assumption of classical linear regression models are shown from table 4 through table 8 (see: Appendices).

4.1. Assumptions of Classical Linear Regression Test Results For model 1

Coefficients of determination of the test results for model 1 show that the constant, or intercept term for the line of best fit, differs significantly from zero. When UE is zero, CAR is 0.002765, and the slope or coefficient for percentage UE is positive. The slope coefficient is 0.020656 with a standard error of 0.012703. The t value = slope coefficient/standard error = 0.020656 /0.012703= 1.626138. This is highly statistically significant ($p < 0.000$). The standardized partial regression coefficient or beta weight is 146.9375. A one standard deviation change in the explanatory variables percentage UE results in a 146.9375 standard deviation change in the dependent variable percentage CAR (See: Appendix 4). This implies that the sampled banks exhibited strong return-to-earnings relation.

To find the best-fitting model equation for predicting new and yet unknown scores on CAR from scores on UE, a classical regression methodology was used and the estimated theoretical equation is:

$$CAR_i = \alpha_1 + \alpha_2 UE_i + \varepsilon_i$$

The regression equation is:
$CAR_i = 0.002765 + 0.020656UE + \varepsilon_i$
(0.7639) (0.1054)

This model fits the data well (F=5.826609, p<.0000 and R-squared=0.4903).

4.2 Assumptions of Classical Linear Regression Test Results For model 2

The test results of model 2 shows that the model has explained about 39.67% of the variation in percentage of CAR with the five explanatory variables percentage of UE, IR, LR, CR, and percentage SR (See: Appendix 5). Coefficients of determination of the model shows that the constant, or intercept term for the line of best fit, when the independent variables = zero, is 0.027727, and the slope or coefficient for percentage UE is positive. The slope or coefficient for percentage IR is negative but the slope or coefficient for percentage LR is positive. The slope or coefficient for percentage CR is positive but the slope or coefficient for percentage SR is negative. The slope coefficient for UE is 0.020656 with a standard error of 0.012919. The t value for UE = slope coefficient/standard error = 0.021066/0.012919=1.630669. The t value for IR = slope coefficient/standard error=-0.02817/0.040421=-0.69682. The t value for LR = slope coefficient/standard error = 0.04109/0.136139 =0.30182. The t value for CR= slope coefficient/standard error = 6.23E-09/8.98E-08 = 0.069428. The t value for SR= slope coefficient/standard error = -0.04252/0.213994 = -0.19871. This is highly statistically significant at significance level (p < 0.000).

The estimated theoretical equation is:
$CAR_i = \alpha_1 + \alpha_2 UE_i + \alpha_3 IR_i + \alpha_4 LR_i + \alpha_5 CR_i + \alpha_6 SR_i + \varepsilon_i$

The regression equation is:

$CAR_i = 0.027727 + 0.021066 * \mathrm{UE} - 0.02817 * \mathrm{IR} + 0.04109 * \mathrm{LR} + 6.23\mathrm{E} * \mathrm{CR} - 0.04252 * \mathrm{SR} + \varepsilon_i$
(0.7312) (0.1045) (0.4867) (0.7631) (0.9447) (0.8427)

This model fits the data well (F=5.163849, p<.0000 and R-squared=0.491927).

4.3. Assumptions of Classical Linear Regression Test Results For model 3

The test results for model 3 shows that the model has explained about 40.39% of the variation in percentage of CAR with the two explanatory variables, percentage UE and MR (See: Appendix 6). Coefficients of determination of the model shows that the constant, or intercept term for the line of best fit, when x = zero, is 0.165998. The slope or coefficient for percentage UE is positive. The slope coefficient is 0.020841with a standard error of 0.012734. The slope or coefficient for percentage MR is negative and is -3.06345 with a standard error of 6.897284. The t value for UE= slope coefficient/standard error = 0.020841/0.012734=1.636732. In additions, the t value for MR= slope coefficient/standard error =-3.06345/6.897284=-0.44415. Thus, it can be said with 95% confidence that the unstandardized weight to apply to UE to predict CAR ranges between 2.454876 and -2.785799, and that the undstandardized weight to apply to MR to predict CAR ranges between 0.088075 and 0.036194.

Estimated Theoretical equation is:
$CAR_i = \alpha_1 + \alpha_2 UE_i + \alpha_8 MR_i + \varepsilon_i$

Regression equation is:
$CAR_i = 0.165998 + 0.020841 * \mathrm{UE} + 3.06345 * \mathrm{MR} + \varepsilon_i$
(0.6521) (0.1032) (0.6574)

This model fits the data well (F=5.648789, p<.0.0000 and R-squared=0.490777).

4.4. Assumptions of Classical Linear Regression Test Results For model 4

The test results of model 4 shows that the model has explained about 42.97% of the variation in percentage of CAR with two explanatory variables, percentage UE and percentage PR(See: Appendix 7) . Thus, the value of adjusted R square demonstrates that the model accounts for 42.97% of variance in CAR and is a very good model.

The Coefficients of determination in the table shows that the constant, or intercept term for the line of best fit, when x = zero, is -0.10165, and the slope or coefficient for percentage UE is positive. The slope coefficient is 0.020656 with a standard error of 0.012449. The t value for UE= slope coefficient/standard error = 0.020154/0.012449=1.618975. Further, the slope or coefficient for percentage PR is positive. The slope coefficient is 1.719303 with a standard error of 0.550167. The t value for PR= slope coefficient/standard error = 1.719303/0.550167=3.125059. Thus, it can be said with 95% confidence that the unstandardized weight to apply to UE to predict CAR ranges between 2.454876 and -2.785799, and the undstandardized weight to apply to PR to predict CAR ranges between 0.144447 and 0.018780 respectively (see: Table 4.1).

Estimated theoretical equation is:

$$CAR_1 = \alpha_1 + \alpha_2 UE_i + \alpha_7 PR_i + \varepsilon_i$$

Regression equation is:

$$CAR_1 = -0.10165 + 0.020154 * \mathrm{UE} + 1.719303 * \mathrm{PR} + \varepsilon_i$$

(0.0037) (0.1069) (0.002)

This model fits the data well (F=6.170268, p<.0000 and R-squared=0.512848).

The empirical result indicates a positive /negative significant /insignificant relationship between earnings and stock returns (See: Appendix 7). Some of the risks do have significant effects on that relationship some do not have significant effects on that relationship, which contradict the results of the studies of some researchers and support the results of the studies of others. This argument will be dealt with in detailed manner in the following sections.

5. Empirical Findings and Analysis

This section summarises the main findings of study followed by the contributions of the study in the section that follows. Finally, it provides the limitations of the study.

5.1. The Effect of Unexpected Earning on CAR

The Regression coefficient of variable UE for Model 1 is 0.020656 with t-statistic of 1.626138 indicating that there is a significant relationship between CAR and UE. The value of coefficient of determination is Adjusted R-squared and is 40.61%. The results support the findings of; (Cheng and Ariff 2007); (Elyasiani, et al. 2010); Cheng and Nasir (2008); and (Cheng and Nasir 2010), suggesting that UEs are positively related to CARs.

5.2. The Effect of Interest, Liquidity, Credit, Solvency Risks and Unexpected Earning On CAR

Regression coefficient UE variable is 0.021066 with t-statistic of 1.630669 indicating that there is a positively significant relationship between UE on CAR. The result is consistence with study of (Myers, et al. 2007) that provided evidence on firms that report long “strings” of consecutive increases in earnings per share (EPS) to enjoy abnormal returns

Regression coefficient for IR variable is -0.02817 with t-statistic of -0.69682 indicating that there is a negatively significant relationship between IR on CAR. Supported result of similar study of (Louzis, et al. 2012) who found that business loans and mortgages) as macroeconomic and bank-specific variables and found that business and consumer NPLs is negatively and statistically significant related to interest rates and credit risk.

Regression coefficient for LR variable is 0.04109 with t-Statistic 0.30182 indicating that there is a positively significant relationship between LR on CAR. The result contradicts the findings of similar studies conducted by previous researchers, (Cheng and Ariff 2007); Cheng and Nasir (2008); (Chan and Faff 2003); and (Dimitropoulos, et al. 2010) whose statistical results indicated that liquidity risk negatively affected the relationship between UE and CAR. However, according to (Cheng and Ariff 2007), the negative sign of the coefficient of the liquidity risk factor is due to an indication of the banks inabilities to fund their financial needs. Further, they concluded that the negative sign also mean lack of the investor's valuation of the bank share prices in response to the earnings changes.

Regression coefficient for CR variable is 6.23E-09 with t-statistic of 0.069428 indicating that there is a negatively significant relationship between CR on CAR. The results indicate that there is a significantly positive effect of credit risk on CAR through UE. The results underlined statements by previous researchers Cheng and Nasir (2008); and (Cheng and Nasir 2010) who claim that credit risks have no effect on the relationship between UE on CAR but contradicts with the results of Cheng and Nasir (2009), which discovers that Australian investors priced the credit risk significantly in the earnings response valuation. The finding also contradicts the finding of (Dimitropoulos, et al. 2010) and (Zakaria, et al. 2013) who claimed that credit risk negatively affect the earnings response coefficient (ERC).

Regression coefficient for SR variable is -0.04252 with t-statistic of -0.19871 indicating that there is a negatively significant relationship between SR on CAR. The results of this study contradicted the results of previous studies (Cheng and Ariff 2007); Cheng and Nasir (2008); and (Cheng and Nasir 2010) who claimed that solvency risk factor does not affect UE and CAR. Nevertheless, this study find that solvency risk have a negatively significant effect on CAR through UE consistence the finding of (Dimitropoulos, et al. 2010) and (Purnamasari, et al. 2012).

5.3. The Effect of Market Risk and Unexpected Earning on CAR

Regression coefficient Model 3 is 0.020841 t-statistic of 1.636732 indicating that there is a positively significant relationship between UE on CAR. Regression coefficient for MR variable is -3.06345 t-statistic of -0.44415 indicating that there is a negatively significant relationship between SR on CAR. This findings is consistence with the findings of (Cheng and Ariff 2007) whose results demonstrated a t-statistic of -2.068 and a p-value of 0.048 which is significant at the usual significant of level 5%. This result is also consistent with the finding of (Yang and Tsatsaronis 2012) who in their business cycle, leverage and bank returns found MR to be –1.08*** in terms of earning responses.

5.4. The Effect of Profit Risk and Unexpected Earning on CAR

Regression coefficient Model 4 is 0.020154 with t-statistic of 1.618975indicating that there is a positively significant relationship between UE on CAR. Regression coefficient for PR variable is 1.719303 with t-statistic of 3.125059 indicating that there is a positively significant relationship between PR on CAR. The results indicate that there is a significant positive effect of price risk on CAR through UE. The results is consistence with the study of (Ghosh, et al. 2005) the effects of sustained increases in earnings and sustained increases in revenues and showed

that firms reporting sustained increases in both earnings and revenues have (1) higher quality earnings and (2) larger earnings response coefficients (ERCs) than other firms reporting sustained increases in earnings alone.

6. Conclusions

The study examined the statistical relationships between UE and CAR in combination with seven risk determinant characteristics to test the returns of banking firms by applying the single index model. Consequently, the study attempts to bridge this gap by investigating whether the determinant factors can enhance the ability of UE to predict CAR.

The sample of this study is 248 banking firms between 2000 and 2010. Four Models were constructed. Model 1, for UE with CAR, Model 2, for UE, IR, LR, CR, SR with CAR, Model 3, for MR and UE with CAR and Model 4 for PR, UE with CAR. The empirical results show that UE has positive significant effect on CAR. The findings also suggest that the financial risk determinant factors do exert less significant influences on unexpected earnings to predict CAR. Therefore, UE is the best predictor of CAR in banking firms.

This study has several limitations. The models are based on fixed effect approaches. A panel data of this type could have included random effect approaches to evaluate the study. This issue can be the focal point of a future subsistence analysis. Further, based on the result of this study, the future research can use this study as a reference for applying another method of earnings to returns research such as growth opportunity, earning persistence and capital structure as additional determinant factors that can be used in future research to get results that are more accurate. In additions, the data used in this study is for 10 years, that is, between 2000 and 2010, which can be bias due to the exclusion of data for the last three years. Apart from the lack of time, the lack of available data handicapped the sample selection, because a number of companies were excluded due to incomplete or missing data.

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Appendix 1 descriptive statistics of all risks and CAR

	CAR	CR	EPS	IR	LR	MR	PR	SR	UE
Mean	0.002379	-7089.912	49.09261	1.407155	0.385995	0.053283	0.060725	0.026728	-0.018659
Median	0.010597	-0.014992	21.51860	1.407233	0.357195	0.050170	0.057727	0.008590	-0.014799
Maximum	0.524437	0.032476	744.4016	1.910452	1.535242	0.088075	0.144447	0.745173	2.454876
Minimum	-0.824679	-1758294.	-252.0290	-1.470902	-0.426725	0.036194	0.018780	0.004020	-2.785799
Std. Dev.	0.187788	111651.8	104.9878	0.286112	0.248923	0.015036	0.021489	0.080586	0.813714
Skewness	-0.573032	-15.65261	3.741432	-6.922316	2.701916	1.210771	0.641924	5.401543	-0.338706
Kurtosis	4.248682	246.0040	20.32028	68.29346	14.59414	3.497601	3.473361	35.92818	4.660930
Jarque-Bera	29.68428	620320.2	3678.515	46034.07	1690.797	63.15192	19.34747	12410.04	33.24827
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000063	0.000000	0.000000
Sum	0.590109	-1758298.	12174.97	348.9745	95.72681	13.21415	15.05975	6.628449	-4.627451
Sum Sq. Dev.	8.710296	3.08E+12	2722542.	20.21941	15.30474	0.055845	0.114061	1.604032	163.5464
Observations	248	248	248	248	248	248	248	248	248

Appendix 2 Correlation of criterion variable and the predictor variables

Correlation Probability	CAR	PR	MR	SR	IR	LR	CR
CAR	1						

PR	0.083956	1					
	0.1876	-----					
MR	-0.10368	0.128366	1				
	0.1034	0.0434	-----				
SR	-0.00275	0.095579	-0.01557	1			
	0.9657	0.1334	0.8073	-----			
IR	0.044487	-0.16896	-0.13131	-0.04539	1		
	0.4856	0.0077	0.0388	0.4767	-----		
LR	0.023599	-0.00516	-0.07572	-0.28559	-0.0208	1	
	0.7115	0.9355	0.2348	0	0.7445	-----	
CR	0.028337	-0.02086	-0.14753	0.01663	0.003023	-0.25808	1
	0.657	0.7438	0.0201	0.7944	0.9622	0	-----

Appendix 3 Covariance of All Risk Determinant Factors and CAR

	CAR	PR	MR	SR	IR	LR	CR
CAR	0.035122	0.000337	-0.000292	-4.14E-05	0.002381	0.001099	591.7411
PR	0.000337	0.00046	4.13E-05	0.000165	-0.001035	-2.75E-05	-49.84422
MR	-0.000292	4.13E-05	0.000225	-1.88E-05	-0.000563	-0.000282	-246.675
SR	-4.14E-05	0.000165	-1.88E-05	0.006468	-0.001042	-0.005706	149.0277
IR	0.002381	-0.001035	-0.000563	-0.001042	0.08153	-0.001475	96.18007
LR	0.001099	-2.75E-05	-0.000282	-0.005706	-0.001475	0.061713	-7143.738
CR	591.7411	-49.84422	-246.675	149.0277	96.18007	-7143.738	1.24E+10

Appendix 4 Cross section and Period fixed effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE	0.020656	0.012703	1.626138	0.1054
C	0.002765	0.009192	0.300784	0.7639
R-squared	0.4903	Mean dependent var		0.002379
Adjusted R-squared	0.406152	S.D. dependent var		0.187788
S.E. of regression	0.144712	Akaike info criterion		-0.89466
Sum squared resid	4.439634	Schwarz criterion		-0.38464
Log likelihood	146.9375	Hannan-Quinn criter.		-0.68935
F-statistic	5.826609	Durbin-Watson stat		2.250794
Prob(F-statistic)	0			

Appendix 5 Cross section and Period fixed effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE	0.021066	0.012919	1.630669	0.1045
IR	-0.02817	0.040421	-0.69682	0.4867
LR	0.04109	0.136139	0.30182	0.7631
CR	6.23E-09	8.98E-08	0.069428	0.9447
SR	-0.04252	0.213994	-0.19871	0.8427
C	0.027727	0.080604	0.343993	0.7312
R-squared	0.491927	Mean dependent var		0.002379
Adjusted R-squared	0.396663	S.D. dependent var		0.187788
S.E. of regression	0.145864	Akaike info criterion		-0.8656
Sum squared resid	4.425465	Schwarz criterion		-0.29891
Log likelihood	147.3339	Hannan-Quinn criter.		-0.63747
F-statistic	5.163849	Durbin-Watson stat		2.262707
Prob(F-statistic)	0			

Appendix 6 Cross section and Period fixed effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE	0.020841	0.012734	1.636732	0.1032
MR	-3.06345	6.897284	-0.44415	0.6574
C	0.165998	0.36763	0.451535	0.6521
R-squared	0.490777	Mean dependent var		0.002379
Adjusted R-squared	0.403895	S.D. dependent var		0.187788
S.E. of regression	0.144987	Akaike info criterion		-0.88753
Sum squared resid	4.435487	Schwarz criterion		-0.36335
Log likelihood	147.0534	Hannan-Quinn criter.		-0.67651
F-statistic	5.648789	Durbin-Watson stat		2.248202
Prob(F-statistic)	0			

Appendix 7 Cross section and Period fixed effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UE	0.020154	0.012449	1.618975	0.1069
PR	1.719303	0.550167	3.125059	0.002

C	-0.10165	0.034605	-2.93742	0.0037
R-squared	0.512848	Mean dependent var		0.002379
Adjusted R-squared	0.429732	S.D. dependent var		0.187788
S.E. of regression	0.14181	Akaike info criterion		-0.93184
Sum squared resid	4.243238	Schwarz criterion		-0.40766
Log likelihood	152.5479	Hannan-Quinn criter.		-0.72082
F-statistic	6.170268	Durbin-Watson stat		2.210494
Prob(F-statistic)	0			

Appendix 8 Cross-section fixed effects test equation

Independent variable	Predicted sign	Actual sign
UE: an unexpected Annual Earnings	Positive	significant
IR: an interest risk factor	Negative	insignificant
LR: a liquidity risk factor	Positive	significant
CR: a credit risk factor	Positive	significant
SR: a solvency risk factor	Negative	insignificant
MR: a market risk factor	Negative	significant
PR: a price risk factor	Positive	significant